

## CLAIMS:

1. A data processing apparatus, comprising
  - a processing circuit, arranged to execute a data producing process and a data consuming process, the data producing process producing a stream of data, the data consuming process consuming the stream of data concurrently with production of the stream;
  - 5 - processing memory accessible to the data consuming process;
  - a first-in first-out circular buffer unit for passing data from the stream between the data producing process and the data consuming process, the circular buffer unit comprising buffer memory, the circular buffer unit writing data-items from the stream in circular fashion into the buffer memory;
  - 10 - a consuming process interface of the circular buffer unit, arranged to use a grain size selection and an auxiliary buffer region selection particular for the data consuming process, the consuming process interface being arranged to process a command for making a data grain from the stream available to the data consuming process, the consuming process interface being arranged to
  - 15 - respond to the command by testing whether addresses of data within the grain to which access has to be gained wrap around in the buffer memory;
  - copy, in response to detection that the addresses wrap around, the grain from the buffer memory to the auxiliary memory region, so that the wrap around is eliminated in the copied grain; and
  - 20 - to return an indication to the consuming process to read the grain from the buffer memory when the addresses do not wrap around inside the grain, or an indication to read from the auxiliary memory region, when the addresses wrap around.
2. A data processing apparatus according to Claim 1, wherein the consuming
  - 25 process interface is arranged to return, in response to the command, a pointer for addressing the buffer memory or the auxiliary memory region for use in address data in the grain, dependent on whether the addresses of the data in the grain in the buffer memory wrap around.

3. A data processing apparatus according to Claim 1, wherein the consuming process is arranged to select an address of the auxiliary memory and the grain size as part of the command.
- 5 4. A data processing apparatus according to Claim 1, wherein the data producing process and the data consuming process are arranged to use a first and second grain size for sending data to and receiving data from the circular buffer unit respectively, the first and second grain size differing from one another.
- 10 5. A data processing apparatus according to Claim 5, wherein the data producing process is arranged to use variable grain sizes for sending data.
6. A data processing apparatus according to Claim 2, wherein the first grain size and a size of the circular buffer unit are selected so that addresses of the data in the circular  
15 buffer unit always wrap around between successive grains of the first grain size.
7. A data processing apparatus according to Claim 1, containing
- a further processing memory accessible to a data producing process for producing the data stream;
  - 20 - a producing process interface of the circular buffer unit, arranged to receive a further auxiliary memory region selection for the data producing process, the producing process interface being arranged to process a further command for outputting an output data grain from the stream, the producing process interface being arranged to
  - respond to the further command by testing whether addresses of data within  
25 the output grain to will wrap around in the buffer memory;
  - to return an indication to the producing process to write the grain to the buffer memory when the addresses do not wrap around inside the grain, or an indication to write to the auxiliary memory region, when the addresses wrap around;
  - copy, in response to detection that the addresses wrap around, the grain from  
30 auxiliary memory region to the buffer memory so that the wrap around is created in the copied grain.
8. A data processing apparatus, comprising

- a processing circuit arranged to execute a data producing process and a data consuming process, the data producing process producing a stream of data, the data consuming process consuming the stream of data concurrently with production of the stream;
  - processing memory accessible to the data producing process;
  - 5 - first-in first-out circular buffer unit for passing data from the stream between the data producing process and the data consuming process, the circular buffer unit comprising buffer memory, the circular buffer unit writing data-items from the stream in circular fashion into the buffer memory;
  - a producing process interface of the circular buffer unit, arranged to use a grain size selection and an auxiliary buffer region selection particular for the data producing process, the producing process interface being arranged to process a command for making memory available to the data producing process for writing a produced grain, the producing process interface being arranged to
  - 10 - respond to the command by testing whether addresses of data within the grain for which memory has to be made available wrap around in the circular buffer memory;
  - 15 - to return an indication to the producing process to write the grain to the buffer memory when the addresses do not wrap around inside the grain, or an indication to write to auxiliary memory region, when the addresses wrap around.
- 20 9. A machine implemented method of generating a machine implementation of a signal processing task, wherein the signal processing task comprises concurrently executing processes between which a data stream is communicated via a circular buffer memory, the method comprising
- providing an application program interface that includes a function to be called
  - 25 by a data consuming one of the processes to gain access to a grain of data stored in the buffer memory, the application program interface providing for selectable definition of a size of the grain and an auxiliary memory region for the data consuming one of the processes, the function being arranged to test whether addresses of the grain to which access has to be gained wrap around in the buffer memory, to copy the grain from the buffer memory to the
  - 30 auxiliary memory region when the addresses wrap around in the grain, so that the wrap around is eliminated in the copied grain, and to return as a result of the call an indication to the consuming one of the processes to read data from the grain from the buffer memory, when the addresses do not wrap around inside the grain, or an indication to read from the auxiliary memory region, when the addresses wrap around in the grain;

- receiving a specification of the signal processing task;
- identifying a call to said function in the specification;
- implementing the call using the function from the application program interface.

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10. A machine implemented method according to Claim 9, wherein the application program interface hides a distribution of processes over processing elements from the specification of the processing task, the implementation of the function being selected according to the distribution.

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11. A machine implemented method according to Claim 10, the method comprising generating integrated circuit manufacturing control information for implementing the machine implementation, and manufacturing an integrated circuit under control of the integrated circuit manufacturing control information.

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12. A computer readable medium comprising an application program interface for accessing a circular FIFO buffer, the application program interface providing for selection of a grain size for an application program that accesses data from the circular FIFO buffer and for definition of an auxiliary memory region for the application program, the application

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program interface comprising a function to be called from the application program for gaining access to a grain from the circular FIFO buffer, the function being arranged to

- test whether addresses of data within the grain to which access has to be gained wrap around in the circular FIFO buffer;
  - copy the grain from the FIFO buffer to an auxiliary memory region when the
- addresses wraps around inside the grain, so that the wrap around is eliminated in the copied grain;
- return, as a result of the call, an indication to read from the FIFO buffer when the addresses do not wrap around inside the grain, or to read from the auxiliary memory region, when the addresses wrap around inside the grain.

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13. A computer readable medium containing a program of instructions for executing the method of Claim 8.